

REMARKS

Claims 1, 7, and 8 are amended. Claims 6 and 9-19 are canceled. New claims 20-36 are added. Claims 2-5 stand as originally filed. Re-examination and reconsideration are requested.

To facilitate entry of the amendments, please find attached hereto a marked-up version of the changes made to the specification and claims by the current amendment. The attached page is captioned "Version with markings to show changes made."

Applicant wishes to note for the record certain irregularities and errors contained in the office action, paper number 5, dated March 19, 2002. Specifically, the Office Action Summary (part of paper number 5) erroneously indicates that claims 1-3 and 5-8 are pending and stand rejected. This is incorrect. Since no claims were canceled in the applicant's previously filed Response to Election Requirement, dated January 31, 2002, all of the originally filed claims (i.e., claims 1-19) remained pending after the election. Therefore, the Summary should have stated that claims 1-19 are pending, with claims 10-19 being withdrawn from consideration. However, this point is now moot in light of applicant's cancellation of claims 10-19 in this Amendment.

In addition, with respect to claim 4, applicant notes that claim 4 remains pending in the application, as it was never canceled. Claim 4 was not rejected in the office action, thus is presumed to contain allowable subject matter.

In the office action response, the examiner acknowledged the applicant's previously filed election without traverse. The examiner also agreed with the arguments previously set forth by applicant that claims 1 and 8 are generic and withdrew his statement that there was no generic claim.

With regard to the specification, the examiner objected to the disclosure as containing certain informalities, as specifically set forth in the office action. The examiner rejected certain ones of claims 1-3 and 6-8 under 35 U.S.C. § 102(b) as being anticipated by Pongratz *et al.*, U.S. Patent No. 5,175,756 ("Pongratz"), Alvarez, U.S. Patent No. 4,756,866 ("Alvarez"), and Miller, U.S. Patent No. 4,980,901 ("Miller"), as specifically set forth in Sections 4-6 of the office action. The examiner also rejected certain ones of claims 5, 6, and 7 under 35 U.S.C. § 103(a) as being unpatentable over Alvarez, Miller, and Pongratz, as set forth in Sections 7-9 of the office action.

Applicant believes that none of the currently pending claims, as amended, are anticipated by or obvious over the cited references and respectfully traverses the examiner's rejections for the

reasons that will be set forth below.

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Re the Specification:

The specification is amended to correct the informalities identified by the examiner and certain other minor typographical errors discovered by the applicant. No new matter is introduced by the amendments.

Re the Claims:

Claim 1 is amended to include a data processing system that produces output data indicative of a lattice characteristic of the specimen being tested.

Claim 7 is amended to change its dependency from claim 6 to claim 1.

Claim 8 is amended to include data processing means for producing output data indicative of a lattice characteristic of the specimen being tested.

New claims 20-36 are directed to non-destructive testing apparatus containing the elements and limitations set forth therein.

Legal Standard For Rejecting Claims  
Under 35 U.S.C. §102(b) and §103

The standard for lack of novelty, that is, for "anticipation," under 35 U.S.C. §102 is one of strict identity. To anticipate a claim for a patent, a single prior source must contain all its essential elements. Hybritech, Inc. v. Monoclonal Antibodies, Inc., 231 USPQ 81, 90 (Fed. Cir. 1986). Invalidity for anticipation requires that all of the elements and limitations of the claims be found within a single prior art reference. Scripps Clinic & Research Foundation v. Genentech, Inc., 18 USPQ2d 1001 (Fed. Cir. 1991). Furthermore, functional language, preambles, and language in "whereby," "thereby," and "adapted to" clauses cannot be disregarded. Pac-Tec, Inc. v. Amerace Corp., 14 USPQ2d 1871 (Fed. Cir. 1990).

The test for obviousness under 35 U.S.C. § 103 is whether the claimed invention would have been obvious to those skilled in the art in light of the knowledge made available by the reference or references. In re Donovan, 184 USPQ 414, 420, n. 3 (CCPA 1975). It requires consideration of the

entirety of the disclosures of the references. In re Rinehart, 189 USPQ 143, 146 (CCPA 1976). All limitations of the claims must be considered. In re Boe, 184 USPQ 38, 40 (CCPA 1974). In making a determination as to obviousness, the references must be read without benefit of applicants' teachings. In re Meng, 181 USPQ 94, 97 (CCPA 1974). In addition, the propriety of a Section 103 rejection is to be determined by whether the reference teachings appear to be sufficient for one of ordinary skill in the relevant art having the references before him to make the proposed substitution, combination, or other modifications. In re Lintner, 173 USPQ 560, 562 (CCPA 1972).

A basic mandate inherent in Section 103 is that a piecemeal reconstruction of prior art patents shall not be the basis for a holding of obviousness. It is impermissible within the framework of Section 103 to pick and choose from any one reference only so much of it as will support a given position, to the exclusion of other parts necessary to the full appreciation of what such reference fairly suggests to one of ordinary skill in the art. In re Kamm, 172 USPQ 298, 301-302 (CCPA 1972). Put somewhat differently, the fact that the inventions of the references and of the applicants may be directed to concepts for solving the same problem does not serve as a basis for arbitrarily choosing elements from references to attempt to fashion applicants' claimed invention. In re Donovan, 184 USPQ 414, 420 (CCPA 1975).

In the case of In re Wright, 6 USPQ2d 1959 (Fed. Cir. 1988) (restricted on other grounds by In re Dillon, 16 USPQ2d 1897 (Fed. Cir. 1990), the CAFC decided that the Patent Office had improperly combined references which did not suggest the properties and results of the applicants' invention nor suggest the claimed combination as a solution to the problem which applicants' invention solved. The CAFC reached this conclusion after an analysis of the prior case law, at p. 1961:

"We repeat the mandate of 35 U.S.C. §103: it is the invention as a whole that must be considered in obviousness determinations. The invention as a whole embraces the structure, its properties, and the problem it solves. See, e.g., Cable Electric Products, Inc. v. Genmark, Inc., 770 F.2d 1015, 1025, 226 USPQ 881, 886 (Fed. Cir. 1985) ("In evaluating obviousness, the hypothetical person of ordinary skill in the pertinent art is presumed to have the 'ability to select and utilize knowledge from other arts reasonably pertinent to [the] particular problem' to which the invention is directed"), quoting In re Angle, 444 F.2d 1168, 1171-72, 170 USPQ 285, 287-88 (CCPA 1971); In re Antonie, 559 F.2d 618, 619, 195 USPQ 6, 8 (CCPA 1977) ("In delineating the invention as a whole, we look not only at the claim in

question... but also to those properties of the subject matter which are inherent in the subject matter and are disclosed in the Specification”) (emphasis in original).

The determination of whether a novel structure is or is not “obvious” requires cognizance of the properties of that structure and the problem which it solves, viewed in light of the teachings of the prior art. See, e.g., In re Rinehart, 531 F.2d 1048, 1054, 189 USPQ 143, 149 (CCPA 1976) (the particular problem facing the inventor must be considered in determining obviousness); see also Lindemann Maschinenfabrik GmbH v. American Hoist and Derrick Co., 730 F.2d 1452, 1462, 221 USPQ 481, 488 (Fed. Cir. 1984) (it is error to focus “solely on the product created, rather than on the obviousness or notoriousness of its creation”) (quoting General Motors Corp. v. U.S. Int’l Trade Comm’n, 687 F.2d 476, 483, 215 USPQ 484, 489 (CCPA 1982), cert. denied, 459 U.S. 1105 (1983)).

Thus the question is whether what the inventor did would have been obvious to one of ordinary skill in the art attempting to solve the problem upon which the inventor was working. Rinehart, 531 F.2d at 1054, 189 USPQ at 149; see also In re Benno, 768 F.2d 1340, 1345, 226 USPQ 683, 687 (Fed. Cir. 1985) (“appellant’s problem” and the prior art present different problems requiring different solutions”).

A reference which teaches away from the applicants’ invention may not properly be used in framing a 35 U.S.C. §103 rejection of applicants’ claims. See United States v. Adams, 148 USPQ 429 (1966).

Re the Anticipation Rejections of Claims 1-3 and 6-8:

The examiner rejected the foregoing claims under Section 102(b) as being anticipated by Pongratz for the reasons set forth in the office action. However, in light of the amendments to the claims, these rejections are now moot and will not be discussed in further detail herein.

With regard to the claims now pending, claim 1 is amended to include a data processing system connected to the detector to produce output data that are indicative of a lattice characteristic of the specimen being tested. This limitation is not met by Pongratz. In Pongratz, the gamma radiation from the annihilation event is used to determine whether a certain element, such as nitrogen, phosphorous, chlorine, and/or oxygen is present in the sample being tested. Pongratz does not teach that the gamma radiation from the annihilation event could be used to provide information regarding a lattice characteristic (i.e., a structural characteristic) of the specimen being tested.

Accordingly, amended claim 1 is not anticipated by Pongratz. Dependent claims 2-5 and 7 are likewise not anticipated by Pongratz in that dependent claims 2-5 and 7 also contain this same limitation which is not met by Pongratz.

Claim 8 is amended to include data processing means for producing output data indicative of a lattice characteristic of the specimen. Again, this limitation is not met by Pongratz, which utilizes the gamma rays produced by annihilation events to determine whether certain elements are present in the specimen. Consequently, amended claim 8 is not anticipated by Pongratz.

Re the Anticipation Rejections of Claims 1-3, 5, and 8:

The examiner rejected claims 1-3, 5, and 8 under Section 102(b) as being anticipated by Alvarez. These rejections are also moot in light of the amended claims, thus will not be discussed in further detail herein.

However, with regard to the currently pending claims, amended claim 1 includes a data processing system that produces output data that are indicative of a lattice characteristic of the specimen. This limitation is not met by Alvarez, which teaches a device for detecting the presence of nitrogen. Nowhere does Alvarez disclose that the gamma radiation from the annihilation event could be used to determine information that is indicative of a lattice characteristic of the specimen. Dependent claims 2, 3, and 5 are also allowable in that they embody, by virtue of their dependencies from claim 1, the same limitations that are not met by Alvarez.

Amended claim 8 is also not anticipated by Alvarez in that Alvarez fails to disclose data processing means for producing output data indicative of a lattice characteristic of the specimen. This limitation is not met by Alvarez, which utilizes the gamma rays produced by annihilation events to determine whether nitrogen is present in the specimen. Consequently, amended claim 8 is not anticipated by Alvarez.

Re the Anticipation Rejections of Claims 1-3, 6, and 8:

The examiner rejected claims 1-3, 6, and 8 under Section 102(b) as being anticipated by Miller. These rejections are also moot in light of the amended claims, thus will not be discussed in further detail herein.

With regard to the claims as currently pending, amended claim 1 includes a data processing system that produces output data that are indicative of a lattice characteristic of the specimen. This limitation is not met by Miller, which teaches a device for detecting the presence of explosive materials, such as nitrogen. Nowhere does Miller disclose that the gamma radiation from the annihilation event could be used to determine information that is indicative of a lattice characteristic of the specimen. Dependent claims 2 and 3 are also allowable in that they embody, by virtue of their dependencies from claim 1, the same limitations that are not met by Miller.

Amended claim 8 is also not anticipated by Miller in that Miller fails to disclose data processing means for producing output data indicative of a lattice characteristic of the specimen. This limitation is not met by Miller, which utilizes the gamma rays produced by annihilation events to determine whether nitrogen is present in the specimen. Consequently, amended claim 8 is not anticipated by Miller.

Re the Obviousness Rejections of Claims 6 and 7:

The examiner rejected claims 6 and 7 under Section 103(a) as being obvious over Alvarez. These rejections are also moot in light of the amended claims, thus will not be discussed in further detail herein.

With regard to the claims now pending, claim 7, as amended, depends from amended claim 1 and includes a data processing system that produces output data that are indicative of a lattice characteristic of the specimen. Claim 7 also requires that the data processing system operate the photon source to produce photons having the predetermined energies. These limitations are not disclosed in or suggested by Alvarez. As mentioned above, Alvarez teaches a device for detecting the presence of nitrogen in materials. Nowhere does Alvarez disclose, or even suggest, that the gamma radiation from the annihilation event could be used to determine information that is indicative of a lattice characteristic of the specimen. Alvarez also fails to teach or suggest using the data processing system to operate the photon source to produce photons having the predetermined energies.

In supporting his rejections the examiner makes much of the fact that the applicant cites "several commercially available data acquisition systems that can be used for the claimed apparatus"

(page 5 of the office action) and that therefore it would be obvious to utilize such systems in the manner set forth in the claims. This is not the test for obviousness under Section 103. The test for obviousness is not whether the various elements of the claim can be found in the prior art, but whether the prior art provides some suggestion, incentive, or motivation to a person having ordinary skill in the art to combine those elements make the claimed combination. As the Court of Appeals for the Federal Circuit has stated:

“If identification of each claimed element in the prior art were sufficient to negate patentability, very few patents would ever issue. Furthermore, in rejecting patents solely by finding prior art corollaries for the claimed elements would permit an examiner to use the claimed invention itself as a blueprint for piecing together elements in the prior art to defeat the patentability of the claimed invention. Such an approach would be an “illogical and inappropriate process by which to determine patentability” [citation omitted]” In re Rouffet, 47 USPQ2d 1453, 1457 (Fed. Cir. 1998).

Since Alvarez does not provide the required suggestion or incentive to modify his device for detecting nitrogen into a device that would provide information relating to a lattice characteristic of the material, the examiner has failed to establish the required *prima-facie* case of obviousness. Amended claim 7 is, therefore, allowable.

Re the Obviousness Rejections of Claims 5 and 7:

The examiner rejected claims 5 and 7 under Section 103(a) as being obvious over Miller. These rejections are also moot in light of the amended claims, thus will not be discussed in further detail herein.

Claims 5 and 7, as currently pending, both include a data processing system that produces output data that are indicative of a lattice characteristic of the specimen. In addition, claim 7 requires that the data processing system operate the photon source to produce photons having the predetermined energies. Neither of these limitations are not disclosed in or suggested by Miller. Miller teaches methods and apparatus for detecting the presence of common explosive materials,

such as nitrogen, in the sample being tested. Nowhere does Miller disclose, or even suggest, that the gamma radiation from the annihilation event could be used to determine information that is indicative of a lattice characteristic of the specimen. With regard to amended claim 7, Miller also fails to teach or suggest using the data processing system to operate the photon source to produce photons having the predetermined energies.

Again, the mere fact that certain (or even all) of the elements in a claim may be found in the prior art is not sufficient to support an obviousness rejection in the absence of some suggestion or incentive in the prior art to combine the elements in the claimed manner. In re Rouffet, supra. Since Miller fails to provide the suggestion or incentive required to modify his device to come up with the claimed invention, the examiner has failed to establish the required *prima-facie* case of obviousness. Therefore, claims 5 and 7 are allowable.

Re the Obviousness Rejection of Claim 5:

The examiner rejected claim 5 under Section 103(a) as being obvious over Pongratz. This rejection is moot in light of the amended claims, thus will not be discussed in further detail herein.

However, with regard to claim 5 as currently pending, claim 5 includes a data processing system that produces output data that are indicative of a lattice characteristic of the specimen. This limitation is not disclosed in or suggested by Pongratz. As already discussed, Pongratz teaches a device for detecting nitrogenous, phosphoric, chloric, and oxygenous substances. Nowhere does Pongratz disclose, or even suggest, that the gamma radiation from the annihilation event could be used to determine information that is indicative of a lattice characteristic of the specimen. Here again, the mere fact that certain of the elements in a claim may be found in the prior art is not sufficient to support an obviousness rejection in the absence of some suggestion or incentive to combine the elements in the claimed manner. In re Rouffet, supra. Since Pongratz fails to provide the suggestion or incentive required to modify his device to come up with the claimed invention, the examiner has failed to establish the required *prima-facie* case of obviousness. Therefore, claim 5 is allowable.

Re New Claims 20-36:



Newly submitted claims 20-36 are directed to non-destructive testing apparatus utilizing at least (to paraphrase the specific claim language) a photon source, a detector, and a data processor for determining a lattice characteristic of the specimen being tested.

While the prior art references all disclose various devices and methods for detecting the presence of certain elements in the specimen (e.g., nitrogen), none of the references even suggest, much less disclose, systems that could be used to determine a lattice characteristic of the specimen being tested. Moreover, since each cited reference is presumed to be effective and operative for its own purposes (e.g., in detecting the presence of a certain element in the specimen), there is no need, thus no suggestion or incentive, to modify any reference to do something entirely different, namely, to determine a lattice characteristic of the specimen.

The case of In re Fritch, 23 USPQ2d 1780 (Fed. Cir. 1992) is instructive as to the obviousness issues in this type of situation. Fritch involved the consideration of the obviousness of claims directed to a landscape edging device having a planar base portion and an upwardly extending retainer portion. The base portion is elongate, thin, flexible, and has a planar bottom surface conformable to a varying slope ground surface. One longitudinal edge of the base portion serves as a mowing strip and the other serves as a retaining flange for landscape fill. The upwardly extending retainer portion is integrally connected to the base portion and defines a longitudinally extending enclosed space.

The prior art cited by the examiner in the Fritch case included the Wilson patent and the Hendrix patent. The Wilson patent disclosed a grass edging and watering device having a substantially flat mowing strip extending horizontally from a longitudinally extending body portion. Opposite the mowing strip is a scored flange which may be broken off when not needed or wanted. Between the mowing strip and the flange, and extending vertically from the body portion is an anchoring leg. The Hendrix patent disclosed a loose material retainer strip having elongated, flexible strips with substantially C-shaped cross-sections. The bottom lip of the device is wider than the top lip in order to facilitate fastening the device to the ground.

In reversing the rejections of the patent examiner and the Board of Patent Appeals and Interferences, the Federal Circuit stated that it was not sufficient that the various prior art references disclosed the various elements of the claimed device or even that it would be possible to combine

the various elements in the manner of the claimed invention. Rather, the court reiterated that:

“Obviousness cannot be established by combining the teachings of the prior art to produce the claimed invention, absent some teaching or suggestion supporting the combination. Under section 103, teachings of the references can be combined *only* if there is some suggestion to do so. Although couched in terms of combining teachings found in the prior art, the same inquiry must be carried out in the context of a purported obvious ‘modification’ of the prior art. The mere fact that the prior art may be modified in the manner suggested by the Examiner does not make the modification obvious unless the prior art suggested the desirability of the modification.” *Id.* at 1783. (Emphasis in original, citations omitted).

The holding of Fritch is dispositive of the obviousness issue in this case. That is, Fritch compels a finding of non-obviousness where, as here, the prior art does not suggest the desirability of any modification or combination that would make obvious the currently pending claims. Stated another way, even if the prior art could be modified to make obvious the currently pending claims, the prior art still cannot make obvious the currently pending claims since none of the prior art references suggest the desirability of the modifications.

Applicant believes that all of the claims now pending in this patent application, as amended and described above, are now allowable and that all other issues raised by the examiner have been addressed. Therefore, applicant respectfully requests the examiner to reconsider his rejections and to grant an early allowance. If any questions or issues remain to be resolved, the examiner is requested to contact the applicant’s attorney at the telephone number listed below.

Respectfully submitted,

Date: \_\_\_\_\_

7/12/02



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**VERSION WITH MARKINGS TO SHOW CHANGES MADE****In the Specification:**

Paragraph 0002 on page 1 is amended as follows:

This invention relates generally to non-destructive testing of materials and more specifically to methods and apparatus for performing non-destructive testing of materials using [position] positron annihilation.

Paragraph 0005 on page 2 is amended as follows:

In one type of positron annihilation technique, positrons from a radioactive source (e.g.,  $^{22}\text{Na}$ ,  $^{68}\text{Ge}$ , or  $^{58}\text{Co}$ ) are directed towards the material to be tested. Upon reaching the material, the positrons are rapidly "thermalized." That is, the positrons rapidly [loose] lose most of their kinetic energy by collisions with ions and free electrons present at or near the surface of the material. After being thermalized, the positrons then annihilate with electrons in the material. During the diffusion process, the positrons are repelled by positively charged nuclei, and thus tend to migrate toward defects such as dislocations in the lattice sites where the distance to positively charged nuclei is greater. In principle, positrons may be trapped at any type of lattice defect having an attractive electronic potential. Most such lattice defects are so-called "open volume" defects and include, without limitation, vacancies, vacancy clusters, vacancy-impurity complexes, dislocations, grain boundaries, voids, and interfaces.

Paragraph 0020 on page 7 is amended as follows:

As will be described in greater detail below, the method and apparatus of the present invention are suitable for use with materials or specimens 18 that will produce positrons in response to photon bombardment from the photon source 12. One way for producing positrons involves the decay of neutron-deficient isotopes. In the present invention, the

photons 16 from the photon source 12 produce such neutron-deficient isotopes within the specimen 18 by removing or "knocking-off" neutrons from atoms within the specimen 18. The neutron-deficient isotopes (referred to herein in the alternative as "positron emitters") then decay into non-neutron-deficient atoms by the emission of positrons and neutrinos. Consequently, the bombardment of a material or specimen 18 containing certain isotopes amenable to the loss of neutrons by such photon bombardment will result in the formation of positrons within the material or specimen 18. This process is referred to herein as "photo-neutron activation" or, simply, "photon activation." Any material containing isotopes susceptible to such photon activation [are] is suitable for use with the present invention.

Paragraph 0033 on page 13 is amended as follows:

Another significant advantage of the present invention is that it may be made specific to particular isotopes within the specimen. That is, by adjusting the energies of the photons 16 from the photon source 12, the photons 16 may be used to selectively activate one or more positron emitters within the specimen 18 while leaving other positron emitters un-activated. Moreover, compared with conventional positron annihilation analysis devices, the present invention may be made quite small and portable, thereby allowing the present invention to be readily and easily utilized in field settings to analyze materials and specimens in-situ. The present invention may also be used to monitor materials during production and/or processing, thereby allowing for the early detection of non-compliant materials and for the possibility of adjusting production parameters and processes to minimize the creation of non-compliant materials.

In the Claims:

1. (Amended) Non-destructive testing apparatus, comprising:

a photon source, said photon source producing photons having a predetermined energy [and directing the photons toward a specimen being tested, the photons from said photon source resulting in the creation of positrons within the specimen being tested]; [and] *use*

a detector, said detector positioned adjacent the specimen being tested so that said detector detects gamma rays [produced by annihilation of positrons with electrons[, the gamma rays produced by the annihilation of positrons with electrons being indicative of a material characteristic of the specimen being tested]; and

a data processing system operatively associated with said detector, said data processing system producing output data indicative of a lattice characteristic of the specimen being tested. *use*

7. (Amended) The non-destructive testing apparatus of claim [6] 1, wherein said data processing system [is operatively associated with said photon source, said data processing system operating said photon source to produce photons having the predetermined energies.] *use*

8. (Amended) Non-destructive testing apparatus, comprising:

photon generating means for producing photons having predetermined energies and for directing the photons toward a specimen being tested, the photons from said photon generating means resulting in the creation of positrons within the specimen being tested; [and]

detecting means for detecting gamma rays [produced by annihilation of positrons with electrons within the specimen being tested [and for producing an output indicative of a material characteristic of the specimen being tested]; and

data processing means operatively associated with said detecting means for producing output data indicative of a lattice characteristic of the specimen being tested.